UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/508,430	03/13/2000	RUDOLF MEIER	030705-164	1172

21839 7590 01/05/2004

BURNS DOANE SWECKER & MATHIS L L P
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404

EXAMINER	
AKHAVANNIK, HUSSEIN	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 01/05/2004

18

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/508,430	MEIER ET AL.	
	Examiner	Art Unit	
	Hussein Akhavannik	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-17 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-17 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 03 February 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The amendment to claim 15 overcomes the Examiner's objection cited in paragraph 4 of the previous office action (now Paper No. 8).

Response to Arguments

2. Applicant's arguments filed December 4, 2003 have been fully considered but they are not persuasive.

Applicant alleges on page 6, lines 21-24 of the remarks that Leuenberger fails to disclose the step of sorting the data associated with detected faults according to at least two parameters included in the data and representing the detected faults in an image as a function of the at least two parameters. The Examiner respectfully disagrees. Leuenberger discloses sorting the defected faults according to three parameters in figure 3. Leuenberger explains in column 5, lines 36-66 that the signal indicating the probability that a defect is present in the corresponding area of the web is read together with data relating to the position of the area from which the signal is derived. The probability that the defect is present is indicated by the gray-level intensity of each block in figure 3, corresponding to the first parameter. Leuenberger explains that the probability of a defect being present is determined by a filter, which can be optimized by a neural network in column 4, lines 6-39. The inputs to the filter are the signals detected from the web that represent brightness or intensity of the web. The position of the defect will be two-dimensional, as the web is a rectangle that has two dimensions. The horizontal position of a defect illustrated in figure 3 and corresponds to a second parameter and the vertical position of a defects is also illustrated in figure 3, corresponding to a third parameter.

Applicant alleges on page 7, lines 9-11 of the remarks that the system of Leuenberger does not need to sort the grayscale values and positional data of the detected faults, as it is sorted in relation to the camera position. The Examiner respectfully disagrees. The defects are sorted according to their horizontal and vertical positions in figure 3, as the positions indicate the location of the defect on the output device (such as a visible display). The defects do need to be sorted according to their vertical and horizontal positions, so that the defects are displayed correctly on the visible display. The order of the positions of the defects on the output device will directly depend on their respective horizontal and vertical coordinates.

Applicant alleges that the clusters of Brecher et al are not equivalent to fault classes on page 8, lines 8-9 of the remarks. The Examiner respectfully disagrees. Brecher et al explain in column 8, lines 1-18 that the clustering illustrated in figure 3 identifies two types of defect regions: type A and type B. Thus, when a defect pixel is detected, it can be determined which type of defect region the pixel belongs to by determining the Mahalanobis distance of the pixel from each of the clusters. For example, the defect pixel in figure 3 is illustrated to be "closer" to a type B pixel than a type A pixel. Therefore, the defect pixel will be classified as a type A defect pixel. Therefore, the clusters of Brecher et al do correspond to fault classes and are a function of three variables, as illustrates by Brecher et al in figure 3.

Applicant alleges that the fields being defined by the values of two selected parameters, the extent of each field characterizing a class of a fault is not disclosed or suggested by Brecher et al on page 9, lines 3-6 of the remarks. The Examiner respectfully disagrees. Brecher et al illustrate in figure 3 that the fields of type A and type B classes are defined by three values: red color intensity, green color intensity, and blue color intensity. Furthermore, Brecher et al explain

that the classification criteria can be based a number of parameters in column 10, lines 31-42 and illustrated in figure 7 by reference number 79, including: size, shape, texture, location (corresponding to the vertical and horizontal positions of Leuenberger), composition, color, and contrast. The extent of each field characterizing a class is explicitly explained by Brecher et al in column 8, lines 16-18. Brecher et al explain that if the distance of a pixel from the center of a class field exceeds a threshold (corresponding to the extent), then the class of the pixel is labeled as unknown. Therefore, the threshold magnitude represents the extent of each field characterizing a class in the system of Brecher et al.

Applicant alleges that the Examiner has failed to provide any motivation to combine the teachings of Leuenberger and Brecher et al on page 9, lines 7-11 of the remarks. The Examiner respectfully disagrees. Leuenberger explicitly discloses that a computer can be used in combination with the defect detecting system to further classify the defect regions so that they can be associated with different types (or classes) of defects in column 4, lines 29-39. Leuenberger gives an example that that the defects illustrated in figure 3 can be classified into the weft defect and warp defect classes. Brecher et al further disclose a system that can classify defect as illustrated in figures 3 and 7 and explained in column 8, lines 1-18. Brecher et al explains that their classification system can be used in any automatic defect classification system that comprises a means for detecting object defects in a digital input image, such as the system proposed by Leuenberger, in column 4, lines 33-52. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the classification system of Brecher et al into the textile defect detecting system of Leuenberger as Leuenberger strongly suggests the use of classification of the identified defects.

Applicant alleges that the Examiner has failed to provide any evidence of the desirability of combining the parameters explained by Meier et al to the system of Leuenberger in view of Brecher et al on page 9, lines 28-29 of the remarks. The Examiner respectfully disagrees. In paragraph 9 of the previous Office Action (now Paper No. 8), the Examiner explains that by determining the dimensions of a defect in a textile monitoring system, such as the system of Leuenberger, the grade of a fabric can be determined. Determining the grade of a fabric is desirable because a defect that is too large will render the textile useless. Thus, by determining the dimensions of a defect, it can be determined whether the defect is completely detrimental to the fabric. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select parameters of a defect, such as length and width, to characterize textiles.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the

reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Leuenberger (U.S. Patent No. 6,100,989).

Referring to claim 1,

i. Receiving data associated with a plurality of faults detected on a swatch of the surface of the fabric is explained by Leuenberger in column 3, lines 33-65 and illustrated in figures 1 and 3. Leuenberger illustrate two (corresponding to a plurality) detected faults in figure 3 and explain that the data corresponding to the faults is the intensity detected from the faults.

ii. Sorting the data associated with the plurality of faults detected on a swatch of the surface of the fabric is illustrated by Leuenberger in figure 3. Leuenberger explains in column 5, lines 36-66 that the signal indicating the probability that a defect is present in the corresponding area of the web is read together with data relating to the position of the area from which the signal is derived. The probability that the defect is present is indicated by the gray-level intensity of each block in figure 3, corresponding to the third parameter. The position of the defect will be two-dimensional, as the web is a rectangle that has two dimensions. The horizontal position of a defect illustrated in figure 3 and corresponds to a first parameter and the vertical position of a defects is also illustrated in figure 3, corresponding to a second parameter. The defects are sorted according to their horizontal and vertical positions in figure 3, as the positions indicate the location of the defect on the output device (such as a visible display).

iii. Representing the plurality of detected faults in an image as a function of the at least two parameters is explained by Leuenberger in column 5, lines 63 to column 6, line 3 and illustrated in figure 3.

Referring to claim 2, the swatch forming a rectangle whose sides extend parallel and perpendicularly to the boundaries of the fabric is illustrated by Leuenberger in figures 1 and 3. Reference numbers 5 and 6 of figure 1 are areas that are imaged and both areas have sides that extend parallel and perpendicularly to the boundaries of the fabric. Leuenberger explains imaging these areas in column 4, line 67 to column 5, line 6.

Referring to claim 3, the data associated with the faults including the extent of a detected fault in two directions is explained by Leuenberger in column 5, lines 58-63. The position of the camera would relate to the extent of the detected fault as the camera is moved along the swatch in figure 1 in the direction of arrow 9. Leuenberger also explains that the camera could be moved in a direction other than that of arrow 9 in column 6, lines 42-46, therefore being able to obtain the extent of the detected fault in two directions.

Referring to claim 4, the data associated with the faults including the intensity of a fault is explained by Leuenberger in column 5, lines 43-46.

Referring to claim 5, the data associated with the faults including the form of a fault is explained by Leuenberger in column 4, lines 29-39. Two forms of the fault explained by Leuenberger can be a weft fault and a warp fault.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 7-10 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leuenberger in view of Brecher et al (U.S. Patent No. 5,544,256).

Referring to claim 7, the image consisting of fields and a class being associated with each field is not explicitly explained by Leuenberger. However, Leuenberger discloses that a computer can be used in combination with the defect detecting system to further classify the defect regions so that they can be associated with different types (or classes) of defects on column 4, lines 29-39. Leuenberger gives an example that that the defects illustrated in figure 3 can be classified into the weft defect and warp defect classes. Brecher et al further disclose a system that can classify defect as illustrated in figures 3 and 7 and explain the classification system in column 8, lines 1-18. Brecher et al classify defect pixels into two classes: type A and type B. Brecher et al explains that their classification system can be used in any automatic defect classification system that comprises a means for detecting object defects in a digital input image, such as the system proposed by Leuenberger, in column 4, lines 33-52. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the classification system of Brecher et al into the textile defect detecting system of Leuenberger to define fields in an image and associate each field with a class of the defects as Leuenberger strongly suggests the use of classification of the identified defects.

Referring to claim 8, the values for the detected number of faults in the fabric being associated with the classes is explained by Leuenberger in column 4, lines 29-39. The value

associated with defect 11 indicates a weft defect and the value associated with defect 12 indicates a warp defect.

Referring to claim 9, the classes being divided into groups by boundaries is not explicitly explained by Leuenberger. However, Brecher et al do illustrate such boundaries in figure 7 and explain the extent of the boundary being defined by a threshold in column 8, lines 16-18. Leuenberger does illustrate boundaries of the detected faults by gray scale values representative of the probability of that region containing a fault. Therefore, the regions with gray scale values about 0 (indicating white) would indicate the boundary of the defect. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to divide the classes of faults into separate groups by boundaries so that the classes can be clearly defined.

Referring to claim 10,

i. Receiving a plurality of parameters associated with each detected fault on a swatch of fabric corresponds to claim 1. The parameters include intensity, probability of being a defect, horizontal direction, and vertical direction.

ii. Classifying the detected faults based on a selected set of the plurality of parameters corresponds to claim 7.

iii. Representing the classification of a plurality of detected faults in an image where at least two axes represent two selected parameters corresponds to claim 7. Figure 3 of Leuenberger illustrates the x-axis corresponding to the horizontal position and the y-axis corresponding to the vertical direction.

iv. A series of fields that lie in a plane defined by the values of the two selected parameters, the extent of each field characterizing a class of fault representing the

classification of each detected fault in an image corresponds to claim 7. The extent of the non-white regions in areas of defects 11 and 12 illustrated by Leuenberger in figure 3, represent the field of each defect. Furthermore, Brecher et al illustrate fields that corresponds to different classes in figure 7 and explain a threshold defining the extent of the class in column 8, lines 16-18.

Referring to claim 16, the image further comprising representations of a third parameter corresponds to claim 1. The first and second parameters are the horizontal and vertical positions, respectively. The third parameter corresponds to the probability that the defect is present as explained by Leuenberger in column 5, lines 36-66. The probabilities are represented by the gray scale value of each block illustrated by Leuenberger in figure 3.

Referring to claim 17, the third parameter being the intensity of the fault is explained by Leuenberger in column 5, lines 36-66. Leuenberger explains that the brightness (or intensity) values recorded from the partial areas of the fabric are supplied to the filter, which transits an output value. Leuenberger then explains that this output signal indicates the probability that a defect is present in the corresponding area of the web. Therefore, the third parameter, corresponding to claim 16, is representative of the intensity of the fault.

7. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leuenberger in view of Brecher et al, and further in view of Meier et al (U.S. Patent No. 5,834,639).

Referring to claim 11, the two selected parameters being the length and width of a fault and the fields characterizing the detected faults according to size is not explicitly explained by Leuenberger or Brecher et al. However, Meier et al illustrate classifying faults found in yarn

using the length of the fault and the yarn cross section, corresponding to the width of the fault. Meier et al explain in column 7, lines 37-61 that the areas 37-39 correspond to regions of different fault classes. Leuenberger classifies the defects according to their position in the fabric and probability of being a defect. By thresholding the defect probability with an acceptable probability threshold, the length, width, and size of each defect could easily be determined in the system of Leuenberger. Determining the dimensions of a defect would be beneficial to any textile monitoring system so that the grade of the fabric can be determined. Also, if a defect is too large is any dimension, the textile will be rendered useless. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the parameters of length and width to characterize textiles.

Referring to claim 12, the two selected parameters being the area of a fault and the intensity of a fault in percentages is not explicitly explained by Leuenberger or Brecher et al. Leuenberger does explain one of the parameters being the intensity of a fault, corresponding to claim 17. However, Leuenberger or Brecher et al do not explain a parameter being the area of the fault. Meier et al do explain using the length and the cross section of a fault to classify a textile defect, corresponding to claim 11. Because the images of the fabric of Leuenberger and the yarn of Meier et al are two-dimensional, knowing the length and the width of the fault would provide all the information needed to determine the rectangular area of the fault through simple multiplication. Thus, the length and width measurements could be multiplied and supplied to one axis of a two dimensional feature space and the intensity of the fault can be supplied to the second dimension of the feature space so that faults can be classified. The sizes of the faults are essential in textiles, as faults that are too large will render a textile completely useless.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to categorize the faults in the system of Leuenberger according to the size of the faults and the intensity of the faults.

Referring to claim 13, the two selected parameters being the length and the intensity of a fault is not explicitly explained by Leuenberger or Meier et al. Leuenberger does explain using the intensity of a fault as a parameter, corresponding to claim 17. Meier et al explain using the length of a fault as a parameter, corresponding to claim 11. The sizes of the faults are essential in textiles, as faults that are too large will render a textile completely useless. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the length and intensity of a fault to categorize a fault.

Referring to claim 14, the fabric swatch being comprised of a plurality of rectangle units whose sides extend parallel and perpendicularly to boundaries of the fabric and wherein one of the plurality of parameters associated with each fault is the number of units in two directions occupied by the fault is not explicitly explained by Leuenberger or Brecher et al. Leuenberger does illustrate in figure 1 that the fabric is made up of a plurality of rectangular units (7) whose sides extend parallel and perpendicularly to the boundaries of the fabric. However, Leuenberger does not explain one of the parameters being the number of units in two dimensions occupied by the fault. Using the area of a fault as a parameter of classification corresponds to claim 12. Because the image of Leuenberger is composed of blocks, it would have been obvious to one of ordinary skill in the art to represent the size of a fault by the number of blocks it occupies.

Referring to claim 15, the two selected parameters being the number of occupied units and the intensity of a fault in percentages corresponds to claim 12. The area of the fault may be

represented by the number of occupied units of the fault, corresponding to claim 14. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the number of occupied units and the intensity of a fault as parameters to categorize the fault.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

> Connelly et al (U.S. Patent No. 4,745,555) – To exhibit classifying fabrics according to their color as explained in the abstract and illustrated in figure 2.
>
> Leuenberger (U.S. Patent No. 6,501,086) – To exhibit classifying fabric defects according to the defect length and contrast as explained in the abstract and illustrated in figure 1.
>
> Hoeller (U.S. Patent App. Pub. No. 2002/0062775 A1) – To exhibit a system that adjusting the clearing limit of yarn as explained in the abstract.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hussein Akhavannik whose telephone number is (703)306-4049. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on (703)305-4706. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

Hussein Akhavannik H.A.
December 24, 2003

LEO BOUDREAU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600